

New Castle County 2009 International Energy Conservation Code Requirements and Procedures

**As required by the state of Delaware
through Chapter 187
(Formerly Senate Bill 59 as
amended by senate amendment no. 3)**

Residential usage only

**Occupancy type R-3 buildings as well as R-2 and R-4 buildings 3 stories or less in
height above grade**

2009 International Energy Conservation Code Requirements and Procedures

Chapter 187, entitled 'An Act to Amend Title 16 of the Delaware Code Relating to Energy Conservation' enacted in 2009, requires all municipalities and jurisdictions within the state of Delaware to adopt and enforce the most recent version of the International Energy Conservation Code, as written with no amendments. All single family dwelling permits issued on or after January 1, 2010 require an option to the prospective homeowner to conform to the 2009 IECC. All single family dwelling permits issued on or after July 1, 2010 are required to conform to the 2009 IECC and will be inspected to ensure compliance by the New Castle County Department of Land Use.

Although there are many minor changes, the main focus of the changes made to the International Energy Conservation Code for 2009 is in the areas of building tightness and air infiltration issues. Many specific requirements and tests are prescribed. The IECC offers two choices to verify building envelope tightness – a blower door test (done at the completion of construction but prior to the county's final inspection), or a visual inspection of compliance which will be done by county personnel. The IECC specifically denies the installers the right to self-certify a visual inspection. These components will be verified by enhancing the inspections already in place; there will be no need to add new inspections to verify compliance at this time. Depending on the project construction methods and design, one item may be seen at multiple inspections.

A whole house blower door test may not be required, but a duct leakage test for **all** ducts and equipment outside the building thermal envelope is a requirement. The test must be performed on the entire system in question; this test may be performed at either the rough-in stage or at post-construction. Either test, whole house or duct, must be performed by a nationally certified testing agency; there is no prohibition in the code against the HVAC or insulation installation company from certifying their own work if they are so certified. To be acceptable, the testing certification must be in the form recognized by the accrediting body and must include numbers meeting or exceeding those required by the 2009 IECC. New Castle County does reserve the right to request quantifying data for any test results that appear to be outside the normal range or for any certification that seems incomplete.

Performance evaluations (Energy Star) or software (REScheck) can be used but do not take the place of any **mandatory** section of the IECC. Energy Star rating cannot be completed by the county but must be done by an accredited rater.

Within the next few weeks, the checklists used by the county building inspection members will be revised to show the new inspection components, some of which may appear on more than one inspection; this is due to the possibility of more than one method of construction or to a complexity of assembly.

This report is intended to give the enforcement agencies and the contractors involved a well grounded base of understanding of code requirements and enforcement options. We hope to foster further discussions on code interpretations and the ways these codes will be verified and enforced. The bill does not give individual jurisdictions within the state the ability to amend or to selectively enforce the International Energy Conservation Code.

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CHAPTER 4

RESIDENTIAL ENERGY EFFICIENCY

CHANGES FROM THE 2006 TO THE 2009 IECC

401 General

401.1 Scope. No changes were made to this section

401.2 Compliance. This section has changed from the 2006 code. It states that projects shall comply with ALL mandatory sections of the code. You then have the option of choosing either the prescriptive section of the code (e.g. REScheck) or the performance based sections of the code.

401.3 Certificate. This section states that a permanent certificate shall be posted on the electrical panel. It shall list all R-values of the insulation and ductwork, U-factors, SHGC, and the efficiency of heating, cooling and service water heating equipment.

402 Building Thermal Envelope (Prescriptive)

402.1 General. No changes were made to this section. However, there were changes made to Table 402.1.1. The changes made were to the fenestration U-factor column and the mass wall R-value column. The U-factor has changed to .35. The mass wall R-value also includes an R-value of 10 when more than 50% of the insulation is located on the inside of the wall. R-5 insulation is only acceptable when more than half the insulation required is installed on the outside of the wall – see section 303.2.1 for weather resistance requirements.

402.2 Specific Insulation Requirements. (Prescriptive)

402.2.1 Ceilings with attic spaces. The only change here states the reduction of R-value shall not apply to the U-factor alternative approach and the total UA alternative approach.

402.2.2 Ceilings without attic spaces. The only change here states the reduction of R-value shall not apply to the U-factor alternative approach and the total UA alternative approach.

402.2.3 Access hatches and doors. This section was added to require all access doors from conditioned to unconditioned spaces be weatherstripped and insulated to a level equivalent to the insulation on the surrounding surfaces. A code opinion request was submitted to ICC about this section asking if the insulation is required to be permanently attached to the access. Their answer states the intent of the code is to allow the insulation to move when the door is opened and then be in place when the door is replaced. It does not state how to achieve this but we believe the best way to accomplish this is by attaching the insulation to the door. See attached response from ICC regarding this subject.

402.2.4 Mass walls. This section has changed to state mass walls for the purposes of this chapter shall be considered above-grade walls. Below grade walls shall not be

- considered mass walls. Below grade walls must be insulated to meet the requirements of 402.2.7 (Basement walls) or 402.2.9 (Crawl space walls).
- 402.2.5 Steel-frame ceilings, walls, and floors.** This section was changed to include an exception for Climate Zones 1 and 2. This exception does not apply as NCC is located in Climate Zone 4.
- 402.2.6 Floors.** No changes were made to this section. Insulation shall be installed to maintain permanent contact with the underside of the sub floor.
- 402.2.7 Basement walls.** No changes were made to this section. This section requires the walls be insulated to a depth of 10 feet below grade or the basement floor, whichever is less.
- 402.2.8 Slab-on-grade floors.** No changes were made to this section. For NCC, slab on grade floors shall be insulated to a depth of at least 2 feet with a minimum of R-10 insulation.
- 402.2.9 Crawl space walls.** This section was changed to require the use of a Class 1 (0.1 perms or less) vapor retarder.
- 402.2.10 Masonry veneer.** No changes were made to this section. Insulation shall not be required on the horizontal portion of the foundation that supports masonry veneer.
- 402.2.11 Thermally isolated sunroom insulation.** No changes were made to this section. This section requires insulation to be installed when a sunroom is built and is separated from the existing building (any new wall separating the sunroom from conditioned space must meet current building thermal envelope requirements). It must meet these criteria; the glazing area must exceed 40%, the thermal envelope of the existing building is left intact and the sunroom shall be independently conditioned. It does allow for a reduction in the ceiling R-value to R-19. See also 402.3.5 for the *U*-factor requirements.
- 402.3 Fenestration (Prescriptive)**
- 402.3.1 *U*-factor.** No changes were made to this section.
- 402.3.2 Glazed fenestration SHGC.** No changes were made to this section.
- 402.3.3 Glazed fenestration exemption.** The only change here states the exemption shall not apply to the *U*-factor alternative approach and the total UA alternative approach. It only allows up to 15 square feet to be exempted per dwelling unit.
- 402.3.4 Opaque door exemption.** The only change here states the exemption shall not apply to the *U*-factor alternative approach and the total UA alternative approach. It only allows up to 24 square feet to be exempted per dwelling unit.
- 402.3.5 Thermally isolated sunroom *U*-factor.** No changes were made to this section. This section requires the *U*-factor not exceed .50 in our Climate Zone. The maximum skylight *U*-factor shall not exceed .75. It must meet these criteria; the thermal envelope of the existing building is left intact and shall be independently conditioned. It does allow for an increase of the *U*-factor.
- 402.3.6 Replacement fenestration.** No changes were made to this section. Although a permit is not required to replace windows when there is no size change or other re-framing required, the glazed fenestration is still required to comply with this code.

402.4 Air Leakage (Mandatory)

402.4.1 Building thermal envelope. Two items were added to the list of areas that need to be sealed; Attic access openings and Rim joist junctions.

402.4.2 Air sealing insulation. This is a new section in the code. It states the building envelope air tightness and insulation installation shall be demonstrated to comply by using one of two testing options. This is accomplished by using a blower door test or a visual inspection.

402.4.2.1 Testing option. The building envelope tightness and insulation installation shall be considered acceptable when tested air leakage is less than 7 air changes per hour. This test shall occur after rough-in and ALL penetrations have been installed. All windows shall be closed, all dampers shall be closed but not sealed, interior doors shall be open, exterior openings shall be closed and sealed when used for continuous ventilation systems and heat recovery ventilators, HVAC system shall be turned off, HVAC ducts shall not be sealed, and supply and return registers shall not be sealed.

402.4.2.2 Visual inspection option. The building envelope tightness and insulation installation shall be considered acceptable when the items listed in Table 402.4.2, applicable to the method of construction, are field verified. See attached table and explanation of each item. The code official can require the inspection be performed by an approved party independent from the installer of the insulation.

402.4.3 Fireplaces. New wood-burning fireplaces shall have gasketed doors and outdoor combustion air.

402.4.4 Fenestration air leakage. No changes were made to this section. Windows, skylights and sliding glass doors shall have an air infiltration rate of no more than .3 cfm per square foot. Swinging doors shall not exceed .5 cfm.

402.4.5 Recessed lighting. Recessed lighting installed in the building thermal envelope shall be sealed to limit air leakage between conditioned and unconditioned spaces. They shall be sealed with a gasket or caulk between the housing and the interior wall or ceiling covering.

402.5 Maximum fenestration U-factor and SHGC (Mandatory). No changes were made to this section. Maximum fenestration *U*-factor shall not exceed .48 in NCC when using trade-offs.

403 Systems

403.1 Controls (Mandatory). No changes were made to this section. At least one thermostat shall be provided for each separate heating and cooling system.

403.1.1 Programmable thermostat. Where the primary heating system is a forced-air furnace, at least one thermostat per dwelling unit shall be capable of controlling the heating and cooling system on a daily schedule to maintain different temperature set points at different times of the day. It shall be initially programmed with a heating temperature set point no higher than 70°F and a cooling temperature set point no lower than 78°F. A code opinion request was submitted to ICC about this section asking if the existing home would need to be updated with a new thermostat. Their answer states only the new addition would

need to be provided with a programmable thermostat if it has a separate HVAC system from the existing house. See attached response from ICC regarding this subject.

403.1.2 Heat pump supplementary heat (Mandatory). No changes were made to this section.

403.2 Ducts.

403.2.1 Insulation (Prescriptive) The only change to this section is the change from a mandatory requirement to prescriptive. There is still a requirement to be R-8 on the supply ducts in attics only and R-6 on all other ducts.

403.2.2 Sealing (Mandatory). Although the ducts still need to be sealed as they were in the 2006 code, there is now a requirement to test the tightness of the ducts. This can be done using one of two options: a Postconstruction test or a Rough-in test. The Postconstruction test shall be performed after the house is complete and the Rough-in test shall be performed prior to the drywall being installed. The air handler does not have to be installed at the Rough-in test but all register boots shall be sealed during the test. The only time the test would not be required is when all ducts are located inside conditioned space.

403.2.3 Building cavities (Mandatory). No changes were made to this section. Building framing cavities shall not be used as supply ducts.

403.3 Mechanical system piping insulation (Mandatory). Mechanical system piping capable of carrying fluids above 105°F or below 55°F shall be insulated to a minimum R-3.

403.4 Circulating hot water systems (Mandatory). No changes were made to this section. Piping insulation shall be a minimum of R-2.

403.5 Mechanical ventilation (Mandatory). No changes were made to this section. Outdoor air intakes and exhaust shall have automatic gravity dampers that close when not in use.

403.6 Equipment sizing (Mandatory). No changes were made to this section. Equipment shall be sized to accommodate the heating and cooling loads of the house and meet the minimum codes applicable.

403.7 Systems serving multiple dwelling units (Mandatory). These systems shall comply with sections 503 and 504 for Commercial Energy Efficiency in lieu of section 403

403.8 Snow melt system controls (Mandatory). Snow and ice melting systems, supplied through energy service to the building, shall include automatic controls capable of shutting off the system when the pavement temperature is above 50°F and no precipitation is falling and an automatic or manual control that will shut off when the temperature exceeds 40°F.

403.9 Pools (Mandatory). Pools shall be provided with energy conserving measures in accordance with this code.

403.9.1 Pool Heaters. All pool heaters shall be equipped with a readily accessible on/off switch. Pool heaters fired by natural gas shall not have continuously burning pilot lights.

403.9.2 Time switches. Time switches that can automatically turn off and on heaters and pumps shall be installed on pool heaters and pumps.

403.9.3 Pool covers. Heated pools shall be equipped with a vapor-retardant pool cover on or at the water surface.

404.1 Lighting equipment (Prescriptive). A minimum of 50 percent of the lamps in permanently installed lighting fixtures shall be high-efficacy lamps. A code opinion request was submitted to ICC about this section asking them to clarify this section. They state there is a code change approved to revise this section to make this a mandatory section. It was never intended to be prescriptive. See attached response from ICC regarding this subject. This section, as it is adopted, is not mandatory if you are using Section 405 to comply with this code.

405 Simulated performance alternative (Performance). This section allows the use of compliance software to offer alternatives to the code and still demonstrate compliance with the code.

405.2 Mandatory requirements. Compliance with this section requires that the mandatory provisions identified in Section 401.2 be met. All supply and return ducts not completely inside the building thermal envelope shall be insulated to a minimum of R-6. A code opinion request was submitted to ICC about this section asking them to clarify this section. ICC stated if the performance section is used, all ducts outside the building envelope can meet a minimum of R-6. See attached response from ICC regarding this subject.

The following information was taken from an article titled “Impacts of the 2009 IECC for Residential Buildings at State Level.” As noted below, some major new changes were included in the 2009 IECC.

The IECC also had substantial revisions from 2006 to 2009. These revisions were not to the code format, but rather were changes to specific requirements to improve energy efficiency and make the code more stringent.

The 2009 has some important new requirements:

- The duct system now has to be tested and the air leakage out of ducts must be kept to an acceptable maximum level. Testing is not required if all ducts are

inside the building envelope (for example in heated basements), though the ducts still have to be sealed.

- 50% of the lighting “lamps” (bulbs, tubes, etc.) in a building have to be energy efficient. Compact fluorescents qualify, standard incandescent bulbs do not.
- Trade-off credit can no longer be obtained for high efficiency HVAC equipment. For example, if a high efficiency furnace is used, no reduction in wall insulation is allowed. This will have a great impact on reducing the flexibility allowed by REScheck software. No energy impact is assigned to this code change in the analysis of updating state codes to the 2009 IECC in this report.
- Vertical fenestration U-factor requirements are reduced from 0.75 to 0.65 in Climate Zone 2, 0.65 to 0.5 in Climate Zone 3, and 0.4 to 0.35 in Climate Zone 4.
- The maximum allowable solar heat gain coefficient is reduced from 0.40 to 0.30 in Climate Zones 1, 2, and 3.
- R-20 walls in climate zones 5 and 6 (increased from R-19)
- Modest basement wall and floor insulation improvements
- R-3 pipe insulation on hydronic distribution systems (increased from R-2)
- Limitation on opaque door exemption both size and style (side hinged)
- Improved air-sealing language
- Controls for driveway/sidewalk snow melting systems
- Pool covers are required for heated pools.

The following information was taken from an article titled “Impacts of the 2009 IECC on Residential Buildings in Delaware.” As noted below, these are some of the major changes that apply for Delaware only.

Notable requirements in the 2009 IECC:

- Building envelope must be caulked and sealed.
- Slab-on-grade insulation is R-10 to a depth of 2 feet.
- Supply ducts in attics must be insulated to R-8. Return ducts in attics and all ducts in crawlspaces, unheated basements, garages, or otherwise outside building envelope must be insulated to R-6.
- All ducts must be sealed and either:
 - *verified by pressure testing* – the duct system has to be tested and the air leakage out of ducts must be kept to an acceptable maximum level.
 - *installed entirely within the building thermal envelope* – testing is not required if all ducts are inside the building thermal envelope (for example in heated basements), though the ducts still have to be sealed.
- Piping for hydronic (boiler) heating systems must be insulated to R-3.
- Although vapor retarders are not required by the IECC, the I-codes do set wall vapor retarder requirements in Section R601.3 of the 2009 IRC. However, vapor retarders are not required in Delaware.
- Less insulation is allowed for mass walls and more insulation is required for steel framing.
- 50% of the lighting “lamps” (bulbs, tubes, etc.) in a building must be high efficacy. Compact fluorescents qualify, standard incandescent bulbs do not.

- Standard I-code administrative requirements (inspections, documentation) apply.
- A certificate must be posted near the electrical panel listing insulation levels and other energy efficiency measures.

Exemptions/Allowances from prescriptive measures:

- One door and 15 ft² of window area are exempt
- Skylight U-factors are allowed to be U-0.60
- 500 ft² or 20% of ceiling area of cathedral ceiling, whichever is less, is allowed to have R-30 insulation

Mandatory Requirements:

- Windows can never exceed an area-weighted U-factor of 0.48. The 2009 IECC also identifies a set of other requirements that are strictly “mandatory” that must be done in all buildings, such as building envelope and duct sealing.

From: Doug Connell [DConnell@iccsafe.org]
Sent: Wednesday, February 03, 2010 11:54 AM
To: Lis Valdemarsen
Cc: Connors, Michael
Subject: RE: 09 IECC 402.2.3 (Q1) (DC)

February 3, 2010

Subject: 09 IECC Section 402.2.3

Q: Section 402.2.3 of the 2009 IECC states "Access doors from conditioned spaces to unconditioned spaces (e.g. attics and crawl spaces) shall be weatherstripped and insulated to a level equivalent to the insulation on the surrounding surfaces." Is it the intent of this section to require the insulation be permanently attached to the access door? For instance, can the insulation simply lie on top of the access door when located in a ceiling below an attic?

A: The code does not prescribe "how" the access doors are to be insulated. The code states that the access hatches or doors are to be insulated to a level equivalent to the surrounding surfaces. The surrounding surfaces have insulation that is not "permanently" attached, but it does not move. The hatch door will be moved and the intent of the code is that the insulation can be moved with the door and then be in place when the hatch door is put back in the opening. That is the intent. The code does not tell you how to do this. It is up to the building official.

This opinion is based on the information which you have provided. We have made no independent effort to verify the accuracy of this information nor have we conducted a review beyond the scope of your question. As this opinion is only advisory, the final decision is the responsibility of the designated authority charged with the administration and enforcement of this code

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From: Doug Connell [DConnell@iccsafe.org]
Sent: Wednesday, February 03, 2010 2:42 PM
To: Lis Valdemarsen
Cc: Connors, Michael
Subject: RE: 09 IECC 403.1.1 (Q2) (DC)
February 3, 2010

Subject: 09 IECC Section 403.1.1

Q: Section 403.1.1 of the 2009 IECC states "Where the primary heating system is a forced-air furnace, at least one thermostat per dwelling unit shall be capable of controlling the heating and cooling system on a daily schedule to maintain different set points at different times of the day." If an addition is built on a house and the primary heating and cooling system is the one in the existing house, does the existing thermostat have to be replaced with a programmable thermostat? If a new addition is heated solely by a new forced air furnace, but the existing house is not heated by a forced air furnace system, is the addition's thermostat required to be programmable?

A: Section 101.4.3 of the IECC says all there is to say about additions to existing buildings. Nothing in Section 403.1.1 mentions additions to existing houses. Only the addition has to comply with the IECC requirements. The existing unaltered portion of the building or building system (that is existing HVAC system) need not comply. If the new additions has a new HVAC system, the HVAC system and its related controls (that is thermostats) must meet the new IECC requirements.

This opinion is based on the information which you have provided. We have made no independent effort to verify the accuracy of this information nor have we conducted a review beyond the scope of your question. As this opinion is only advisory, the final decision is the responsibility of the designated authority charged with the administration and enforcement of this code.

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From: Doug Connell [DConnell@iccsafe.org]
Sent: Thursday, February 04, 2010 10:33 AM
To: Lis Valdemarsen
Cc: Connors, Michael
Subject: RE: 09 IECC 404.1 (Q3) (DC)
February 3, 2010

Subject: 09 IECC Section 402.2.3

Q: Section 404.1 of the 2009 IECC states "A minimum of 50 percent of the lamps in permanently installed lighting fixtures shall be high-efficacy lamps." What makes this section prescriptive? The REScheck program from the Department of Energy does not account for the amount of lighting installed in a home. Is there a scenario where you could install less than 50 percent of the total lighting?

A: There was a code change approved to revise the 2009 IECC Section 404.1 to make it 'mandatory' instead of 'prescriptive'. The code change was EC 128-09/10. The reason given was that it was intended to be mandatory all along. You are correct. But for now it is prescriptive and apparently unenforceable if you accept REScheck program although the committee on record states that it was intended to be mandatory all along. No you cannot use less than 50% high-efficacy lamps.

This opinion is based on the information which you have provided. We have made no independent effort to verify the accuracy of this information nor have we conducted a review beyond the scope of your question. As this opinion is only advisory, the final decision is the responsibility of the designated authority charged with the administration and enforcement of this code

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From: Doug Connell [DConnell@iccsafe.org]
Sent: Thursday, February 04, 2010 10:55 AM
To: Lis Valdemarsen
Cc: Connors, Michael
Subject: RE: 09 IECC 401.2 & 405.2 (Q4) (DC)
February 4, 2010

Subject: 09 IECC Section 401.2 & 405.2

Q: Section 405.2 of the 2009 IECC states "Compliance with this section requires that the mandatory provisions identified in Section 401.2 be met. All supply and return ducts not completely inside the building thermal envelope shall be insulated to a minimum of R-6." Is it the intent of this section to require the ductwork R-value to be included on a compliance report in order to be dropped to R-6? The REScheck program from the Department of Energy does not account for the ductwork R-value installed outside the building thermal envelope. Does it mean that as long as the mandatory provisions are met, the R-value can be dropped to R-6 even if the ductwork is not calculated in a compliance report?

A: If you use the performance method in Section 405, you must provide a minimum of R6 duct insulation on ducts outside the building envelope. No the duct performance does not have to be part of the simulated or proposed designs. The models may or may not include the duct insulation.

This opinion is based on the information which you have provided. We have made no independent effort to verify the accuracy of this information nor have we conducted a review beyond the scope of your question. As this opinion is only advisory, the final decision is the responsibility of the designated authority charged with the administration and enforcement of this code

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From: Doug Connell [DConnell@iccsafe.org]
Sent: Thursday, February 04, 2010 12:40 PM
To: Lis Valdemarsen
Cc: Connors, Michael
Subject: RE: 09 IECC Table 402.4.2 (DC)
February 4, 2010

Subject: 09 IEBC Table 402.4.2

Q: Table 402.4.2 of the 2009 IECC states "Air-permeable insulation is inside of an air-barrier" in the first row of the table. My question is, how would an air barrier be installed in a common wall between dwelling units if the insulation would have to be located on the inside of an air barrier?

A: I am not at all sure that the energy code even requires insulation between dwelling units. The intent of the requirement is to provide the air barrier on the exterior of the building envelope with the insulation inside. That has no meaning with apartment separation walls.

This opinion is based on the information which you have provided. We have made no independent effort to verify the accuracy of this information nor have we conducted a review beyond the scope of your question. As this opinion is only advisory, the final decision is the responsibility of the designated authority charged with the administration and enforcement of this code

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Table 402.4.2
AIR BARRIER AND INSULATION INSPECTION COMPONENT
CRITERIA TIMETABLE

COMPONENT	CRITERIA	INSPECTION ^a
Air barrier and thermal barrier	Exterior thermal envelope insulation for framed walls is installed in substantial contact and continuous alignment with building envelope air barrier. Breaks or joints in the air barrier are filled or repaired. Air-permeable insulation is not used as a sealing material. Air permeable insulation is inside of an air barrier.	INSULATION WEATHER BARRIER INSULATION INSULATION
Ceiling/attic	Air barrier in any dropped ceiling/soffit is substantially aligned with insulation and any air gaps are sealed. Attic access (except unvented attic), knee wall door, or drop down stair is sealed.	CLOSE-IN, INSULATION, FINAL FINAL
Walls	Corners and headers are insulated. Junction of foundation and sill plate is sealed.	INSULATION CLOSE-IN
Windows and doors	Space between window/door jambs and framing is sealed.	WEATHER BARRIER
Rim joists	Rim joists are insulated and include an air barrier.	WEATHER BARRIER, INSULATION, FINAL
Floors (including above-garage and cantilevered floors)	Insulation is installed to maintain permanent contact with underside of subfloor decking. Air barrier is installed at any exposed edge of insulation.	INSULATION
Crawl space walls	Insulation is permanently attached to walls. Exposed earth in unvented crawl spaces is covered with Class I vapor retarder with overlapping joints taped.	FINAL
Shafts, penetrations	Duct shafts, utility penetrations, knee walls, and flue shafts opening to exterior or unconditioned space are sealed.	CLOSE-IN, INSULATION, FINAL
Narrow cavities	Batts in narrow cavities are cut to fit, or narrow cavities are filled by sprayed/blown insulation.	INSULATION
Garage separation	Air sealing is provided between the garage and conditioned spaces.	CLOSE-IN, INSULATION, FINAL
Recessed lighting	Recessed light fixtures are air tight, IC rated, and sealed to drywall. Exception – fixtures in conditioned spaces.	CLOSE- IN, FINAL
Plumbing and wiring	Insulation is placed between outside and pipes. Batt insulation is cut to fit around wiring and plumbing, or sprayed/blown insulation extends behind piping and wiring	INSULATION
Shower/tub on exterior wall	Showers and tubs on exterior walls have insulation and an air barrier separating them from the exterior wall.	CLOSE-IN, INSULATION
Electrical/phone box on exterior walls	Air barrier extends behind boxes or air-sealed type boxes are installed	CLOSE-IN
Common wall	Air barrier is installed in common wall between dwelling units.	CLOSE-IN, WEATHER BARRIER
HVAC register boots	HVAC register boots that penetrate building envelope are sealed to subfloor or drywall.	CLOSE-IN, FINAL
Fireplace	Fireplace walls include an air barrier.	WEATHER BARRIER, CLOSE-IN

a. Some components of larger assemblies may require inspections at more than one stage of construction to verify compliance of all components – the possible inspection times will be separated by commas. All other inspections listed without comma separation are for separately listed criteria under the same component.

Note: Text shown in Green reference items associated with electric
Text shown in Red reference items associated with plumbing
Text shown in Blue reference items associated with HVAC

2009 IECC Residential Visual Inspection of Air Barrier Components for Inspection – Table 402.4.2

Footing or foundation - Although not listed on this table, insulation for slab-on-grade monopour must be installed for the footing inspection. And any exterior below grade insulation will be observed at the foundation inspection. *All exterior insulations are required to be protected from the weather by a rigid, opaque and weather resistive covering extending to a minimum of 6 inches below grade. (2009 IECC 303.2.1).*

Weather Barrier – (Air barrier and thermal barrier) Breaks or joints in the air barrier are filled or repaired. *All edges (Roofline and sills included) of house wrap must be taped or otherwise sealed to the mfr's specification. This section precludes the use of felt or grade D paper as an air barrier as these products are considered a weather barrier only and joints and seams are not to be sealed per the manufacturers installation instructions.*

(Windows and doors) Space between window/door jambs and framing is sealed. *There should be no change for window installation or inspection, however, door installation will checked for air seal even when the installation instructions for the door do not require a seal at this time.*

(Rim joists) Rim joists are insulated and include air barrier. *Air barrier must be sealed over the rim joists at this time; the insulation does not need to be installed yet.*

(Electrical/phone box on exterior walls) *Air barrier extends behind boxes or air sealed-type boxes are installed. This applies to electrical boxes facing the outside of the building or, for any reason, cutting through the air barrier. This will need to be confirmed at the air barrier inspection unless the boxes in question are air sealed.*

(Fireplace) Fireplace walls include an air barrier. *In most cases this will be complete with the weather barrier; however, the vent penetration of the housewrap – if applicable – will be verified at the close-in inspection*

Close-in – (Walls) Junction of foundation and sill plate sealed.

Sill sealers may be acceptable. However, a search of several manufacturers websites showed that only about half actually state that their product is an effective air infiltration barrier or seal, others stated that their product only reduces or helps with air infiltration. The inspector may question whether the product installed is actually designed to be used on its own as a seal – manufacturers specifications should always be kept on site unless this product is being backed with caulk or other sealant visible to the inspector.

This component may be difficult to check at close-in inspection – a ladder will need to be provided for the inspection if the inspector cannot see the sill plate seals due to wall heights.

(Shafts, penetrations) Duct shafts, utility penetrations, knee walls and flue shafts opening to exterior or unconditioned space are sealed. *Air-permeable (batts or blown in) insulation products can only be used in these situations if they are **inside** the air barrier. May be done partially at close-in & insulation and completed at final as warranted by individual construction designs.*

(Garage separation) Air sealing is provided between the garage and conditioned spaces. *This includes the sealing of the electrical outlets and light fixtures along with the sill sealing.*

May be done partially or completely at close-in, insulation, or final.

(Recessed lighting) Recessed lighting fixtures are air tight, IC rated, and sealed to drywall. Exception – fixtures in conditioned spaces. *Verification of the fixture type will occur at the close-in inspection; however, the seal to drywall must be checked at final.*

(Shower/tub on exterior wall) Showers and tubs on exterior walls have insulation and air barrier separating them from the exterior wall. *This component requires an air barrier on the inside of the exterior framing to more completely separate the tub/shower. This requirement will be satisfied by a solid tile backing board if the water supplies are not installed in the exterior wall cavity. Can also check at insulation.*

(Common wall) Air barrier is installed in common wall between dwelling units. *This may be checked at the close-in but would more likely be checked at the weather barrier.*

(HVAC register boots) HVAC register boots that penetrate building envelope are sealed to sub floor or drywall. *Most likely done at final but circumstances of individual designs may require the inspector to see a gasket or some other means of sealing the boot at the close-in or insulation.*

(Fireplace) Fireplace walls include an air barrier. *Must be done after the fireplace is installed to verify vertical terminations are sealed against air infiltration. This can be done at either close-in or insulation inspection.*

Insulation - (Air barrier and thermal barrier) Exterior thermal envelope insulation for framed walls is installed in substantial contact and continuous alignment with building envelope air barrier. Air permeable insulation is not used as a sealing material. Air permeable insulation is inside of an air barrier. *Remembering that air-permeable thermal insulation is required to be installed inside the home's air barrier, if a project's design is for the drywall to perform as a portion of the air barrier system, a non-permeable insulation (approved spray foam type) must be used in the exterior walls.*

(Walls) Corners and headers are insulated. *Where headers are not solid through the wall in which they are installed, insulation shall fill all voids. Built up corners shall be insulated in all voids.*

(Rim joists) Rim joists are insulated and include air barrier *Insulation in finished rim joist areas will be checked at this time.*

(Floors, including above-garage and cantilevered floors). Insulation is installed to maintain permanent contact with underside of sub floor decking. Air barrier is installed at any exposed edge of insulation.

(Shafts, penetrations) Duct shafts, utility penetrations, knee walls and flue shafts opening to exterior or unconditioned space are sealed. *Must be done partially at close-in & insulation and completed at final*

(Narrow cavities) Batts in narrow cavities are cut to fit, or narrow cavities are filled by sprayed/blown insulation. *All batts 12 inches and wider are required to be marked with the R-value and for that mark to be visible for inspection & blown or sprayed insulation require specs and installers certification to be on site. (2009 IECC 303.1.1)*

(Garage separation) Air sealing is provided between the garage and conditioned spaces *May be done partially or completely at close-in, insulation, or final, depending on construction methods.*

(Plumbing and wiring) Insulation is placed between outside and pipes. Batt insulation is cut to fit around wiring and plumbing, or sprayed/blown in insulation extends behind piping and wiring. *The code does not specify the minimum R-value required between piping and exterior, only that it be protected from freezing. Batt insulation cannot simply be compressed in the area of these obstructions, the insulation must be cut to fit to minimize the reduction in R-value.*

(Shower/tub on exterior wall) Showers and tubs on exterior walls have insulation and air barrier separating them from the exterior wall. *This component requires an air barrier on the inside of the exterior framing to more completely separate the tub/shower. This requirement will be satisfied by a solid tile backing board if the water supplies are not installed in the exterior wall cavity. Can also check at close-in.*

(Common wall) Air barrier is installed in common wall between dwelling units. *This may be checked at the close-in but would more likely be checked at the insulation inspection.*

(Fireplace) Fireplace walls include an air barrier *Must be done after the fireplace is installed to verify vertical terminations are sealed against air infiltration. This can be done at either close-in or insulation inspection.*

Final – (Ceiling/attic) Air barrier in any dropped ceiling/soffit is substantially aligned with insulation and any gaps are sealed. Attic access (except un-vented attic), knee wall door, or drop down stair is sealed. *Air-permeable insulation cannot be used as an air barrier, and must be installed inside a correctly installed air barrier.*

(Rim joists) Rim joists are insulated and include air barrier. *Unfinished area rim insulation will be checked at this time.*

(Crawl space walls) Insulation is permanently attached to walls. Exposed earth in un-vented crawl spaces is covered with Class I vapor retarder with overlapping joints taped. *Class I vapor retarder has a tensile strength of at least 45lbft/in. and puncture resistance of at least 5 lb.*

(Shafts, penetrations) Duct shafts, utility penetrations, knee walls and flue shafts opening to exterior or unconditioned space are sealed. *May be done partially at close-in & insulation and completed at final*

(Garage separation) Air sealing is provided between the garage and conditioned spaces. *May be done partially or completely at close-in, insulation, or final.*

(Recessed lighting) Recessed lighting fixtures are air tight, IC rated, and sealed to drywall. Exception – fixtures in conditioned spaces. *Seal to drywall must be done at final*

(HVAC register boots) HVAC register boots that penetrate building envelope are sealed to sub floor or drywall. *Most likely done at final but may need to see some at close-in or insulation.*

Impacts of the 2009 IECC on Residential Buildings in Delaware

September 2009

Prepared by Pacific Northwest National Laboratory
for the U.S. Department of Energy Building Energy Codes Program

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(3/2009)

Analysis of 2009 International Energy Conservation Code Requirements for Residential Buildings in Delaware

Summary

Delaware recently adopted the 2009 International Energy Conservation Code (IECC). The code becomes effective July 1, 2010.

Overview of the 2009 IECC

The IECC scope includes residential single-family housing and multifamily housing three stories or less above-grade intended for permanent living (hotel/motel is not “residential”). The code applies to new buildings and additions/alterations/renovations/repairs.

The map below shows the primary building envelope requirements for all residential buildings in the 2009 IECC.



Notable requirements in the 2009 IECC:

- Building envelope must be caulked and sealed.
- Slab-on-grade insulation is R-10 to a depth of 2 feet.
- Supply ducts in attics must be insulated to R-8. Return ducts in attics and all ducts in crawlspaces, unheated basements, garages, or otherwise outside building envelope must be insulated to R-6.
- All ducts must be sealed and either:
 - *verified by pressure testing* – the duct system has to be tested and the air leakage out of ducts must be kept to an acceptable maximum level.

- *installed entirely within the building thermal envelope* – testing is not required if all ducts are inside the building thermal envelope (for example in heated basements), though the ducts still have to be sealed.
- Piping for hydronic (boiler) heating systems must be insulated to R-3.
- Although vapor retarders are not required by the IECC, the I-codes do set wall vapor retarder requirements in Section R601.3 of the 2009 IRC. However, vapor retarders are not required in Delaware.
- Less insulation is allowed for mass walls and more insulation is required for steel framing.
- 50% of the lighting “lamps” (bulbs, tubes, etc.) in a building must be high efficacy. Compact fluorescents qualify, standard incandescent bulbs do not.
- Standard I-code administrative requirements (inspections, documentation) apply.
- A certificate must be posted near the electrical panel listing insulation levels and other energy efficiency measures.

Exemptions/Allowances from prescriptive measures:

- One door and 15 ft² of window area are exempt
- Skylight U-factors are allowed to be U-0.60
- 500 ft² or 20% of ceiling area of cathedral ceiling, whichever is less, is allowed to have R-30 insulation

Mandatory Requirements:

Windows can never exceed an area-weighted U-factor of 0.48. The 2009 IECC also identifies a set of other requirements that are strictly “mandatory” that must be done in all buildings, such as building envelope and duct sealing.

Compliance Paths:

The IECC effectively contains three alternative compliance paths.

- 1) Prescriptive measures. This is considered the simplest path. These requirements do not vary by building size, shape, window area, or other features. The IECC has a single table of requirements for insulation R-values and window and door U-factors and SHGC. There is a corresponding U-factor table that permits compliance of less common component types (e.g., structural insulated panels), albeit without any cross-component trade-offs.
- 2) Total building envelope UA (U-factor multiplied by area). This is the path predominantly used by the REScheck™ software. Based on the prescriptive U-factor table, it allows trade-offs whereby some energy efficiency measures can fall below code requirements if balanced by other measures that exceed code requirements.
- 3) Simulated performance (requires software programs). This path allows compliance if the home has a calculated annual energy consumption (or energy cost) equal to or less than that of a standard reference design that just meets the code’s prescriptive requirements. This path allows for crediting energy efficiency measures not accounted for in the other paths, such as renewable energy measures. The 2009 performance path differs from previous editions of the IECC in that it allows no tradeoff credit for the use of high efficiency space heating, space cooling, or water heating equipment.

BUILDING ENERGY CODES PROGRAM



The U.S. Department of Energy's Building Energy Codes Program is an information resource on national model energy codes. We work with other government agencies, state and local jurisdictions, national code organizations, and industry to promote stronger building energy codes and help states adopt, implement, and enforce those codes.

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2006 vs. 2009 REScheck

As expected, there are some differences with the REScheck software for these two code editions. Two sample REScheck's were completed to see how the software and code changes have affected New Castle County. The sample house is 3000 sq ft, glazing percentage is 14%, and it faces south in climate zone 4. Some of the major changes noticed are;

- The REScheck for the 2006 IECC only allows for UA trade-off to achieve compliance.
- The REScheck for the 2009 IECC allows compliance to be met by using UA trade-off or a performance based approach.
- The 2009 version does not allow the mechanical equipment to be factored in to become compliant with the code. This means one cannot increase the efficiency of the heating and cooling equipment to achieve compliance. The home has to be compliant based solely on the fenestration and the envelope of the house.
- The 2009 version asks for the orientation of the building. This does have an impact on the compliance result.

All things equal except the code edition, the 2006 sample passed 6.9% better than code. The 2009 sample passed 2.0% better than code. Both samples have R-38 in the attic, R-13 in the walls, and R-11 continuous insulation on the basement walls. They also have a .35 *U*-factor and .40 SHCG for the glazing.

This shows the difference between the two codes and how difficult it can be to achieve compliance. Something as small as changing the orientation of the house can have a major impact on code compliance.



REScheck Software Version 4.3.0

Compliance Certificate

Energy Code: 2009 IECC
 Location: New Castle, Delaware
 Construction Type: Single Family
 Building Orientation: Bldg. faces 180 deg. from North
 Glazing Area Percentage: 14%
 Heating Degree Days: 4937
 Climate Zone: 4

Construction Site:

Owner/Agent:

Designer/Contractor:

Compliance: Passes using UA trade-off

Compliance: Maximum UA: 442 Your UA: 433

Assembly	Gross Area or Perimeter	Cavity R-Value	Cont. R-Value	Glazing or Door U-Factor	UA
Ceiling 1: Flat Ceiling or Scissor Truss	1500	0.0	38.0		38
Wall 2: Wood Frame, 16" o.c. Orientation: Right Side	480	13.0	0.0		36
Window 1: Vinyl Frame:Double Pane SHGC: 0.40 Orientation: Right Side	40			0.350	14
Wall 3: Wood Frame, 16" o.c. Orientation: Back	800	13.0	0.0		50
Window 2: Vinyl Frame:Double Pane SHGC: 0.40 Orientation: Back	170			0.350	59
Door 2: Solid Orientation: Back	24			0.200	5
Wall 4: Wood Frame, 16" o.c. Orientation: Left Side	480	13.0	0.0		36
Window 3: Vinyl Frame:Double Pane SHGC: 0.40 Orientation: Left Side	40			0.350	14
Wall 5: Wood Frame, 16" o.c. Orientation: Front	800	13.0	0.0		54
Window 4: Vinyl Frame:Double Pane SHGC: 0.40 Orientation: Front	120			0.350	42
Door 1: Solid Orientation: Front	24			0.200	5
Basement Wall 1: Solid Concrete or Masonry Orientation: Front Wall height: 8.0' Depth below grade: 6.0' Insulation depth: 8.0'	400	0.0	11.0		25
Basement Wall 2: Solid Concrete or Masonry Orientation: Right Side Wall height: 8.0' Depth below grade: 6.0' Insulation depth: 8.0'	240	0.0	11.0		15
Basement Wall 3: Solid Concrete or Masonry Orientation: Back Wall height: 8.0' Depth below grade: 6.0' Insulation depth: 8.0'	400	0.0	11.0		25

Project Title:
 Data filename: C:\Program Files\Check\REScheck\2009 Sample.rck

Report date: 02/19/10
 Page 1 of 6

2009 International Energy Conservation Code Requirements and Procedures

Basement Wall 4: Solid Concrete or Masonry	240	0.0	11.0	15
Orientation: Left Side				
Wall height: 8.0'				
Depth below grade: 6.0'				
Insulation depth: 8.0'				

Compliance Statement: The proposed building design described here is consistent with the building plans, specifications, and other calculations submitted with the permit application. The proposed building has been designed to meet the 2009 IECC requirements in REScheck Version 4.3.0 and to comply with the mandatory requirements listed in the REScheck Inspection Checklist.

Name - Title

Signature

Date



REScheck Software Version 4.3.0 Inspection Checklist

Ceilings:

- ☐ Ceiling 1: Flat Ceiling or Scissor Truss, R-38.0 continuous Insulation

Comments: _____

Above-Grade Walls:

- ☐ Wall 2: Wood Frame, 16" o.c., R-13.0 cavity Insulation

Comments: _____

- ☐ Wall 3: Wood Frame, 16" o.c., R-13.0 cavity Insulation

Comments: _____

- ☐ Wall 4: Wood Frame, 16" o.c., R-13.0 cavity Insulation

Comments: _____

- ☐ Wall 5: Wood Frame, 16" o.c., R-13.0 cavity Insulation

Comments: _____

Basement Walls:

- ☐ Basement Wall 1: Solid Concrete or Masonry, 8.0' ht / 6.0' bg / 8.0' Insul, R-11.0 continuous Insulation

Comments: _____

- ☐ Basement Wall 2: Solid Concrete or Masonry, 8.0' ht / 6.0' bg / 8.0' Insul, R-11.0 continuous Insulation

Comments: _____

- ☐ Basement Wall 3: Solid Concrete or Masonry, 8.0' ht / 6.0' bg / 8.0' Insul, R-11.0 continuous Insulation

Comments: _____

- ☐ Basement Wall 4: Solid Concrete or Masonry, 8.0' ht / 6.0' bg / 8.0' Insul, R-11.0 continuous Insulation

Comments: _____

Windows:

- ☐ Window 1: Vinyl Frame:Double Pane, U-factor: 0.350

For windows without labeled U-factors, describe features:

#Panes _____ Frame Type _____ Thermal Break? _____ Yes _____ No

Comments: _____

- ☐ Window 2: Vinyl Frame:Double Pane, U-factor: 0.350

For windows without labeled U-factors, describe features:

#Panes _____ Frame Type _____ Thermal Break? _____ Yes _____ No

Comments: _____

- ☐ Window 3: Vinyl Frame:Double Pane, U-factor: 0.350

For windows without labeled U-factors, describe features:

#Panes _____ Frame Type _____ Thermal Break? _____ Yes _____ No

Comments: _____

- ☐ Window 4: Vinyl Frame:Double Pane, U-factor: 0.350

For windows without labeled U-factors, describe features:

#Panes _____ Frame Type _____ Thermal Break? _____ Yes _____ No

Comments: _____

Doors:

- ☐ Door 2: Solid, U-factor: 0.200

Project Title:
Data filename: C:\Program Files\Check\REScheck\2009 Sample.rck

Report date: 02/19/10
Page 3 of 6

Comments: _____

- ☐ Door 1: Solid, U-factor: 0.200

Comments: _____

Air Leakage:

- ☐ Joints (including rim joist junctions), attic access openings, penetrations, and all other such openings in the building envelope that are sources of air leakage are sealed with caulk, gasketed, weatherstripped or otherwise sealed with an air barrier material, suitable film or solid material.
- ☐ Air barrier and sealing exists on common walls between dwelling units, on exterior walls behind tubs/showers, and in openings between window/door jambs and framing.
- ☐ Recessed lights in the building thermal envelope are 1) type IC rated and ASTM E283 labeled and 2) sealed with a gasket or caulk between the housing and the interior wall or ceiling covering.
- ☐ Access doors separating conditioned from unconditioned space are weather-stripped and insulated (without insulation compression or damage) to at least the level of insulation on the surrounding surfaces. Where loose fill insulation exists, a baffle or retainer is installed to maintain insulation application.
- ☐ Wood-burning fireplaces have gasketed doors and outdoor combustion air.

Air Sealing and Insulation:

- ☐ Building envelope air tightness and insulation installation complies by either 1) a post rough-in blower door test result of less than 7 ACH at 33.5 psf OR 2) the following items have been satisfied:
 - (a) Air barriers and thermal barrier: Installed on outside of air-permeable insulation and breaks or joints in the air barrier are filled or repaired.
 - (b) Ceiling/attic: Air barrier in any dropped ceiling/soffit is substantially aligned with insulation and any gaps are sealed.
 - (c) Above-grade walls: Insulation is installed in substantial contact and continuous alignment with the building envelope air barrier.
 - (d) Floors: Air barrier is installed at any exposed edge of insulation.
 - (e) Plumbing and wiring: Insulation is placed between outside and pipes. Batt insulation is cut to fit around wiring and plumbing, or sprayed/blown insulation extends behind piping and wiring.
 - (f) Corners, headers, narrow framing cavities, and rim joists are insulated.
 - (g) Shower/tub on exterior wall: Insulation exists between showers/tubs and exterior wall.

Sunrooms:

- ☐ Sunrooms that are thermally isolated from the building envelope have a maximum fenestration U-factor of 0.50 and the maximum skylight U-factor of 0.75. New windows and doors separating the sunroom from conditioned space meet the building thermal envelope requirements.

Materials Identification and Installation:

- ☐ Materials and equipment are installed in accordance with the manufacturer's installation instructions.
- ☐ Insulation is installed in substantial contact with the surface being insulated and in a manner that achieves the rated R-value.
- ☐ Materials and equipment are identified so that compliance can be determined.
- ☐ Manufacturer manuals for all installed heating and cooling equipment and service water heating equipment have been provided.
- ☐ Insulation R-values, glazing U-factors, and heating equipment efficiency are clearly marked on the building plans or specifications.

Duct Insulation:

- ☐ Supply ducts in attics are insulated to a minimum of R-8. All other ducts in unconditioned spaces or outside the building envelope are insulated to at least R-6.

Duct Construction and Testing:

- ☐ Building framing cavities are not used as supply ducts.
- ☐ All joints and seams of air ducts, air handlers, filter boxes, and building cavities used as return ducts are substantially airtight by means of tapes, mastics, liquid sealants, gasketing or other approved closure systems. Tapes, mastics, and fasteners are rated UL 181A or UL 181B and are labeled according to the duct construction. Metal duct connections with equipment and/or fittings are mechanically fastened. Crimp joints for round metal ducts have a contact lap of at least 1 1/2 inches and are fastened with a minimum of three equally spaced sheet-metal screws.

Exceptions:

Joint and seams covered with spray polyurethane foam.

Where a partially inaccessible duct connection exists, mechanical fasteners can be equally spaced on the exposed portion of the joint so as to prevent a hinge effect.

Continuously welded and locking-type longitudinal joints and seams on ducts operating at less than 2 in. w.g. (500 Pa).

- ☐ Duct tightness test has been performed and meets one of the following test criteria:

- (1) Postconstruction leakage to outdoors test: Less than or equal to 240.0 cfm (8 cfm per 100 ft² of conditioned floor area).
- (2) Postconstruction total leakage test (including air handler enclosure): Less than or equal to 360.0 cfm (12 cfm per 100 ft² of conditioned floor area) pressure differential of 0.1 inches w.g.
- (3) Rough-in total leakage test with air handler installed: Less than or equal to 180.0 cfm (6 cfm per 100 ft² of conditioned floor area) when tested at a pressure differential of 0.1 inches w.g.
- (4) Rough-in total leakage test without air handler installed: Less than or equal to 120.0 cfm (4 cfm per 100 ft² of conditioned floor area).

Temperature Controls:

- ☐ At least one programmable thermostat is installed to control the primary heating system and has set-points initialized at 70 degree F for the heating cycle and 78 degree F for the cooling cycle.

Heating and Cooling Equipment Sizing:

- ☐ Additional requirements for equipment sizing are included by an inspection for compliance with the International Residential Code.
- ☐ For systems serving multiple dwelling units documentation has been submitted demonstrating compliance with 2009 IECC Commercial Building Mechanical and/or Service Water Heating (Sections 503 and 504).

Circulating Service Hot Water Systems:

- ☐ Circulating service hot water pipes are insulated to R-2.
- ☐ Circulating service hot water systems include an automatic or accessible manual switch to turn off the circulating pump when the system is not in use.

Heating and Cooling Piping Insulation:

- ☐ HVAC piping conveying fluids above 105 degrees F or chilled fluids below 55 degrees F are insulated to R-3.

Swimming Pools:

- ☐ Heated swimming pools have an on/off heater switch.
 - ☐ Pool heaters operating on natural gas or LPG have an electronic pilot light.
 - ☐ Timer switches on pool heaters and pumps are present.
- Exceptions:**
- Where public health standards require continuous pump operation.
 - Where pumps operate within solar- and/or waste-heat-recovery systems.
- ☐ Heated swimming pools have a cover on or at the water surface. For pools heated over 90 degrees F (32 degrees C) the cover has a minimum insulation value of R-12.
- Exceptions:**
- Covers are not required when 60% of the heating energy is from site-recovered energy or solar energy source.

Lighting Requirements:

- ☐ A minimum of 50 percent of the lamps in permanently installed lighting fixtures can be categorized as one of the following:
 - (a) Compact fluorescent
 - (b) T-8 or smaller diameter linear fluorescent
 - (c) 40 lumens per watt for lamp wattage <= 15
 - (d) 50 lumens per watt for lamp wattage > 15 and <= 40
 - (e) 60 lumens per watt for lamp wattage > 40

Other Requirements:

- ☐ Snow- and ice-melting systems with energy supplied from the service to a building shall include automatic controls capable of shutting off the system when a) the pavement temperature is above 50 degrees F, b) no precipitation is falling, and c) the outdoor temperature is above 40 degrees F (a manual shutoff control is also permitted to satisfy requirement 'c').

Certificate:

- ☐ A permanent certificate is provided on or in the electrical distribution panel listing the predominant insulation R-values; window U-factors; type and efficiency of space-conditioning and water heating equipment. The certificate does not cover or obstruct the visibility of the circuit directory label, service disconnect label or other required labels.

NOTES TO FIELD: (Building Department Use Only)



2009 IECC Energy Efficiency Certificate

Insulation Rating		R-Value
Ceiling / Roof		38.00
Wall		13.00
Floor / Foundation		11.00
Ductwork (unconditioned spaces):		

Glass & Door Rating	U-Factor	SHGC
Window	0.35	0.40
Door	0.20	NA

Heating & Cooling Equipment	Efficiency
Heating System: _____	_____
Cooling System: _____	_____
Water Heater: _____	_____

Name: _____ Date: _____

Comments: _____



REScheck Software Version 4.3.0

Compliance Certificate

Energy Code: 2006 IECC
 Location: New Castle, Delaware
 Construction Type: Single Family
 Building Orientation: Bldg. faces 180 deg. from North
 Conditioned Floor Area: 3000 ft²
 Glazing Area Percentage: 14%
 Heating Degree Days: 4937
 Climate Zone: 4

Construction Site:

Owner/Agent:

Designer/Contractor:

Compliance: Passes on UA trade-off

Compliance: Maximum UA: 465 Your UA: 433

Assembly	Gross Area or Perimeter	Cavity R-Value	Cont. R-Value	Glazing or Door U-Factor	UA
Ceiling 1: Flat Ceiling or Scissor Truss	1500	0.0	38.0		38
Wall 2: Wood Frame, 16" o.c. Orientation: Right Side	480	13.0	0.0		36
Window 1: Vinyl Frame:Double Pane SHGC: 0.40 Orientation: Right Side	40			0.350	14
Wall 3: Wood Frame, 16" o.c. Orientation: Back	800	13.0	0.0		50
Window 2: Vinyl Frame:Double Pane SHGC: 0.40 Orientation: Back	170			0.350	59
Door 2: Solid Orientation: Back	24			0.200	5
Wall 4: Wood Frame, 16" o.c. Orientation: Left Side	480	13.0	0.0		36
Window 3: Vinyl Frame:Double Pane SHGC: 0.40 Orientation: Left Side	40			0.350	14
Wall 5: Wood Frame, 16" o.c. Orientation: Front	800	13.0	0.0		54
Window 4: Vinyl Frame:Double Pane SHGC: 0.40 Orientation: Front	120			0.350	42
Door 1: Solid Orientation: Front	24			0.200	5
Basement Wall 1: Solid Concrete or Masonry Orientation: Front Wall height: 8.0' Depth below grade: 6.0' Insulation depth: 8.0'	400	0.0	11.0		25
Basement Wall 2: Solid Concrete or Masonry Orientation: Right Side Wall height: 8.0' Depth below grade: 6.0' Insulation depth: 8.0'	240	0.0	11.0		15
Basement Wall 3: Solid Concrete or Masonry Orientation: Back Wall height: 8.0' Depth below grade: 6.0'	400	0.0	11.0		25

Project Title:
 Data filename: C:\Program Files\Check\REScheck\2006 Sample.rck

Report date: 02/19/10
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ENERGY STAR Qualified Homes Builder Option Package Notes

2004/2006 IECC Climate Zone ¹ – 4ENERGY STAR Window Zone ¹¹ – All

The requirements for the ENERGY STAR Builder Option Package (BOP) are specified in the checklist below.

To qualify as ENERGY STAR using this BOP, a home must meet the requirements specified and be verified and field-tested in accordance with the HERS Standards by a RESNET-accredited Provider. Note that compliance with these guidelines is not intended to imply compliance with all local code requirements that may be applicable to the home to be built.²

Home Address: _____		City: _____		State: _____	
Building System	Inspection Guidelines	Rater Verified	Must Correct	NA	
Cooling Equipment (Where Provided)	Right-sized ³ ≥ 13 SEER A/C; <u>OR</u> Right-sized ³ ≥ 14.5 SEER/ 12 EER/ 8.5 HSPF ENERGY STAR qual. HP ⁴				
Heating Equipment	≥ 90 AFUE gas furnace; <u>OR</u> Right-sized ³ ≥ 14.5 SEER/ 12 EER/ 8.5 HSPF ENERGY STAR qual. HP ⁴ ; <u>OR</u> ≥ 85 AFUE boiler; <u>OR</u> ≥ 85 AFUE oil furnace				
Thermostat ⁴	ENERGY STAR qualified thermostat (except in zones with mass radiant heat)				
Ductwork	Leakage ⁵ : ≤ 4 CFM to outdoors / 100 sq. ft.; <u>AND</u> Insulation ⁶ : ≥ R-6 insulation on ducts in unconditioned spaces				
Envelope	≤ 6 ACH50 Infiltration ^{7,8}				
	≤ Reference UA UA Alternative Approach ⁹ ; <u>OR</u> ≥ 38 R-Value Ceiling Insulation ⁹ ; <u>AND (if applicable)</u> ≥ 30 R-Value Cathedral Ceiling Insulation ⁹ ; <u>AND (if app.)</u> ≥ 13 R-Value Wood Frame Wall Insulation ⁹ ; <u>AND (if app.)</u> ≥ 19 R-Value Floor Over Unconditioned Space Insulation ⁹ ; <u>AND (if app.)</u> ≥ 10 R-Value Crawlspace Wall Insulation Continuous ⁹ ; <u>OR (if app.)</u> ≥ 13 R-Value Crawlspace Wall Insulation Framed ⁹ ; <u>AND (if app.)</u> ≥ 10 R-Value Basement Wall Insulation Continuous ⁹ ; <u>OR (if app.)</u> ≥ 13 R-Value Basement Wall Insulation Framed ⁹ ; <u>AND (if app.)</u> ≥ 10 R-Value Slab Insulation ⁹ ; <u>AND</u>				
Completed Thermal Bypass Inspection Checklist ¹⁰					
Windows ^{11,12,13}	≤ 0.40 U-Value ≤ 0.45 SHGC				
Water Heater ^{14,15}	Gas (EF): 40 Gal = 0.81 60 Gal = 0.57 80 Gal = 0.53 Electric (EF): 40 Gal = 0.93 50 Gal = 0.92 80 Gal = 0.89 Oil or Gas ¹⁶ : Integrated with space heating boiler				
Lighting and Appliances ^{17,18}	Five or more ENERGY STAR qualified appliances, light fixtures, water heaters, ceiling fans equipped with lighting fixtures, and/or ventilation fans				



ENERGY STAR Qualified Homes Builder Option Package Notes

2004/2006 IECC Climate Zone ¹ – 4ENERGY STAR Window Zone ¹¹ – All

1. The appropriate climate zone shall be determined by the 2004 International Residential Code (IRC), Figure N1101.2.
2. Where requirements of the local codes, manufacturers' installation instructions, engineering documents, or regional ENERGY STAR programs overlap with the requirements of these guidelines, EPA offers the following guidance:
 - a. In cases where the overlapping requirements exceed the ENERGY STAR guidelines, these overlapping requirements shall be met;
 - b. In cases where overlapping requirements conflict with a requirement of these ENERGY STAR guidelines (e.g., slab insulation is prohibited to allow visual access for termite inspections), then the conflicting requirement within these guidelines shall not be met. Furthermore, qualification shall still be allowed if the rater has determined that no equivalent option is available that could meet the intent of the conflicting requirement of these ENERGY STAR guidelines (e.g., switching from exterior to interior slab edge insulation).
3. Cooling equipment shall be sized according to the latest editions of ACCA Manuals J and S, ASHRAE 2001 Handbook of Fundamentals, or an equivalent procedure. Maximum oversizing limit for air conditioners and air-source and ground-source heat pumps is 15% with the following two exceptions: single-speed air-source and ground-source heat pumps in buildings with heating loads that exceed cooling loads have a limit of 25% and multi-stage heat pumps do not have a strict limit, but should be sized to allow adequate humidity control in the cooling mode. The following operating conditions shall be used in the sizing calculations and verified where reviewed by the rater:

Outdoor temperatures shall be the 99.0% design temperatures as published in the ASHRAE Handbook of Fundamentals for the home's location or most representative city for which design temperature data are available. Note that a higher outdoor air design temperature may be used if it represents prevailing local practice by the HVAC industry and reflects extreme climate conditions that can be documented with recorded weather data; Indoor temperatures shall be 75 F for cooling; Infiltration rate shall be selected as "tight", or the equivalent term.

In specifying equipment, the next available size may be used. In addition, indoor and outdoor coils shall be matched in accordance with ARI standards.

The stated efficiency requirements are aligned with the increased requirements for ENERGY STAR labeled central air conditioners and air-source heat pumps that went into effect as of January 1, 2009. Equipment manufactured before January 1 is still eligible to earn the ENERGY STAR based on the old performance level. Therefore, there will be a transition period when labeled equipment is commercially available at both the old and new performance levels. Builders must transition to equipment meeting these new ENERGY STAR requirements as stocks of equipment qualified at the old performance levels are exhausted.
4. Homes with heat pumps in Climate Zones 4 and 5 must have an HSPF ≥ 8.5 , which exceeds the ENERGY STAR minimum of 8.2 HSPF. Homes with heat pumps in Climate Zones 6, 7, and 8 cannot be qualified using this BOP, but can earn the label using the ENERGY STAR Performance Path requirements. In homes in all Climate Zones with heat pumps that have programmable thermostats, the thermostat must have "Adaptive Recovery" technology to prevent the excessive use of electric back-up heating.
5. Ducts must be sealed and tested to be ≤ 4 CFM to outdoors / 100 sq. ft. of conditioned floor area, as determined and documented by a RESNET-certified rater using a RESNET-approved testing protocol. If total duct leakage is ≤ 4 CFM to outdoors / 100 sq. ft. of conditioned floor area, then leakage to outdoors does not need to be tested. Duct leakage testing can be waived if all ducts and air handling equipment are located in conditioned space (i.e., within the home's air and thermal barriers) AND the envelope leakage has been tested to be ≤ 3 ACH50 OR ≤ 0.25 CFM 50 per sq. ft. of the building envelope. Note that mechanical ventilation will be required in this situation.
6. EPA recommends, but does not require, locating ducts within conditioned space (i.e., inside the air and thermal barriers), and using a minimum of R-4 insulation for ducts inside conditioned space to prevent condensation.
7. Envelope leakage must be determined by a RESNET-certified rater using a RESNET-approved testing protocol.
8. To ensure consistent exchange of indoor air, whole-house mechanical ventilation is recommended, but not required.



ENERGY STAR Qualified Homes Builder Option Package Notes

2004/2006 IECC Climate Zone ¹ – 4

ENERGY STAR Window Zone ¹¹ – All

9. Insulation levels of a home must meet or exceed Sections N1102.1 and N1102.2 of the 2004 IRC. These sections allow for compliance to be determined by meeting prescriptive insulation requirements, by using U-factor alternatives, or by using a total UA alternative. These sections also provide guidance and exceptions that may be used. However, note that the U-factor for steel-frame envelope assemblies addressed in Section N1102.2.4 shall be calculated using the ASHRAE zone method, or a method providing equivalent results, and not a series-parallel path calculation method as is stated in the code. Additionally, Section N1102.2.2, which allows for the reduction of ceiling insulation in space constrained roof/ceiling assemblies, shall be limited to 500 sq. ft. or 20% of ceiling area, whichever is less. In all cases, insulation shall be inspected to Grade I installation as defined in the RESNET Standards by a RESNET-certified rater.

Note that the fenestration requirements of the 2004 IRC do not apply to the fenestration requirements of the National Builder Option Package. Therefore, if UA calculations are performed, they must use the IRC requirements (with the exception of fenestration) plus the fenestration requirements contained in the national BOP. For more information, refer to the "Codes and Standards Information" document.
10. The Thermal Bypass Inspection Checklist must be completed for homes to earn the ENERGY STAR label.
11. The window performance levels match ENERGY STAR Program Requirements for Residential Windows, Doors, and Skylights— version 4.0, with additional requirements for climate zones 2 and 4. Additional information about version 5.0 of the program requirements for windows, which is more stringent and offers additional savings, can be found at www.energystar.gov/windows.
12. All decorative glass and skylight window area counts toward the total window area to above-grade conditioned floor area (WFA) ratio. For homes with a WFA ratio >18%, the following additional requirements apply:
 - a. In IRC Climate Zones 1, 2, and 3, an improved window SHGC is required, and is determined by:
Required SHGC = $[0.18 / \text{WFA}] \times [\text{ENERGY STAR SHGC}]$
Where the ENERGY STAR SHGC is the minimum required SHGC of the climate-appropriate window specified in this BOP.
 - b. In IRC Climate Zones 4, 5, 6, 7, and 8, an improved window U-Value is required, and is determined by:
Required U-Value = $[0.18 / \text{WFA}] \times [\text{ENERGY STAR U-Value}]$
Where the ENERGY STAR U-Value is the minimum required U-Value of the climate-appropriate window specified in this BOP.
13. Up to 0.75% WFA may be used for decorative glass that does not meet ENERGY STAR requirements. For example, a home with total above-grade conditioned floor area of 2,000 sq. ft. may have up to 15 sq. ft. (0.75% of 2,000) of decorative glass.
14. More efficient water heating equipment represents a significant opportunity for energy savings and a meaningful way to differentiate ENERGY STAR qualified homes from those with standard equipment. An ENERGY STAR qualified water heater not only satisfies the Water Heater efficiency requirements, but also counts toward the requirement for five or more ENERGY STAR qualified lighting products or appliances as detailed in the Lighting and Appliances guideline.
15. To determine domestic hot water (DHW) EF requirements for additional tank sizes, use the following equations:
Gas DHW EF $\geq 0.69 - (0.002 \times \text{Tank Gallon Capacity})$; Electric DHW EF $\geq 0.97 - (0.001 \times \text{Tank Gallon Capacity})$.
16. In homes with gas or oil hydronic space heating, water heating systems must have an efficiency ≥ 0.78 EF. This may be met through the use of an instantaneous water heating system or an indirect storage system with a boiler that has a system efficiency ≥ 85 AFUE. Homes with tankless coil hot water heating systems cannot be qualified using this BOP, but can earn the label using the ENERGY STAR Performance Path requirements.
17. Any combination of ENERGY STAR qualified products listed may be installed to meet this requirement. ENERGY STAR qualified ventilation fans include range hood, bathroom, and inline fans. ENERGY STAR qualified lighting fixtures installed in the following locations shall not be counted: storage rooms (e.g., closets, pantries, sheds), or garages. Eligible appliances include ENERGY STAR qualified refrigerators, dish washers, and washing machines.
18. Efficient lighting fixtures represent a significant opportunity for persistent energy savings and a meaningful way to differentiate ENERGY STAR qualified homes from those meeting minimum code requirements. To learn more about the benefits of increasing the use of efficient fixtures through the installation of the ENERGY STAR Advanced Lighting Package (ALP), refer to www.energystar.gov/alp.

Revised 01/05/2010

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ENERGY STAR Qualified Homes Thermal Bypass Inspection Checklist

The Thermal Bypass Inspection Checklist must be completed for homes to earn the ENERGY STAR label. The Checklist requires visual inspection of framing areas where air barriers are commonly missed and inspection of insulation to ensure proper alignment with air barriers, thus serving as an extra check that the air and thermal barriers are continuous and complete. State, local, and regional codes, as well as regional ENERGY STAR program requirements, supersede the items specified in this Checklist.

Guidance on Completing the Thermal Bypass Inspection Checklist:

1. Accredited HERS Providers and certified home energy raters shall use their experience and discretion in verifying that each Inspection Checklist item is installed per the inspection guidelines (e.g., identifying minor defects that the Provider or rater deems acceptable versus identifying major defects that undermine the intent of the Checklist item).
2. Alternative methods of meeting the Checklist requirements may be used in completing the Checklist, if the Provider deems them to be equivalent, or more stringent, than the Inspection Checklist guidelines.
3. In the event an item on the Checklist cannot be verified by the rater, the home cannot be qualified as ENERGY STAR, unless the builder assumes responsibility for verifying that the item has met the requirements of the Checklist. This option is available at the discretion of the Provider or rater but may not be used to verify more than six (6) items on the Inspection Checklist. This responsibility will be formally acknowledged by the builder signing-off on the Checklist for the item(s) that they verified. The column titled "N/A" should be used when the checklist item is not present in the home or when local code requirements take precedent.
4. The Checklist may be completed for a batch of homes using a RESNET-approved sampling protocol when qualifying homes as ENERGY STAR. For example, if the approved sampling protocol requires rating one in seven homes, then the Checklist will be completed for the one home which was rated.
5. In the event that a Provider or rater finds an item that is inconsistent with the Checklist Inspection guidelines, the home cannot be qualified as ENERGY STAR until the item is corrected in a manner that meets the ENERGY STAR requirements. If correction of the item is not possible, the home cannot earn the ENERGY STAR label.
6. The Provider or rater is required to keep a hard copy record of the completed and signed Checklist. The signature of a builder employee is also required if the builder verified compliance with any item on the Checklist.
7. For purposes of this Checklist, an air barrier is defined as any solid material that blocks air flow between a conditioned space and an unconditioned space, including necessary sealing to block excessive air flow at edges and seams. Additional information on proper air sealing of thermal bypasses can be found on the Building America Web site (www.eere.energy.gov/buildings/building_america) and in the EEBA Builder's Guides (www.eeba.org). These references include guidance on identifying and sealing air barriers, as well as details on many of the items included in the Checklist.



ENERGY STAR Qualified Homes Thermal Bypass Inspection Checklist

Home Address: _____		City: _____		State: _____	
Thermal Bypass	Inspection Guidelines	Corrections Needed	Builder Verified	Rater Verified	N/A
1. Overall Air Barrier and Thermal Barrier Alignment	Requirements: Insulation shall be installed in full contact with sealed interior and exterior air barrier except for alternate to interior air barrier under item no. 2 (Walls Adjoining Exterior Walls or Unconditioned Spaces)				
	All Climate Zones:				
	1.1 Overall Alignment Throughout Home	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
	1.2 Garage Band Joist Air Barrier (at bays adjoining conditioned space)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
	1.3 Attic Eave Baffles Where Vents/Leakage Exist	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
	Only at Climate Zones 4 and Higher:				
	1.4 Slab-edge Insulation (A maximum of 25% of the slab edge may be uninsulated in Climate Zones 4 and 5.)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
	Best Practices Encouraged, Not Req'd:				
1.5 Air Barrier At All Band Joists (Climate Zones 4 and higher)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
1.6 Minimize Thermal Bridging (e.g., OVE framing, SIPs, ICFs)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
2. Walls Adjoining Exterior Walls or Unconditioned Spaces	Requirements: <ul style="list-style-type: none"> Fully Insulated wall aligned with air barrier at both interior and exterior, OR Alternate for Climate Zones 1 thru 3, sealed exterior air barrier aligned with RESNET Grade 1 Insulation fully supported Continuous top and bottom plates or sealed blocking 				
	2.1 Wall Behind Shower/Tub	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
	2.2 Wall Behind Fireplace	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
	2.3 Insulated Attic Slopes/Walls	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
	2.4 Attic Knee Walls	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
	2.5 Skylight Shaft Walls	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
	2.6 Wall Adjoining Porch Roof	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
	2.7 Staircase Walls	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
	2.8 Double Walls	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
3. Floors between Conditioned and Exterior Spaces	Requirements: <ul style="list-style-type: none"> Air barrier is installed at any exposed fibrous insulation edges Insulation is installed to maintain permanent contact with sub-floor above including necessary supports (e.g., staves for blankets, netting for blown-in) Blanket insulation is verified to have no gaps, voids or compression. Blown-in insulation is verified to have proper density with firm packing 				
	3.1 Insulated Floor Above Garage	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
	3.2 Cantilevered Floor	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
4. Shafts	Requirements: Openings to unconditioned space are fully sealed with solid blocking or flashing and any remaining gaps are sealed with caulk or foam (provide fire-rated collars and caulking where required)				
	4.1 Duct Shaft	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
	4.2 Piping Shaft/Penetrations	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
	4.3 Flue Shaft	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
5. Attic/ Ceiling Interface	Requirements: <ul style="list-style-type: none"> All attic penetrations and dropped ceilings include a full interior air barrier aligned with insulation with any gaps fully sealed with caulk, foam or tape Movable insulation fits snugly in opening and air barrier is fully gasketed 				
	5.1 Attic Access Panel (fully gasketed and insulated)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
	5.2 Attic Drop-down Stair (fully gasketed and insulated)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
	5.3 Dropped Ceiling/Soffit (full air barrier aligned with insulation)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
	5.4 Recessed Lighting Fixtures (ICAT labeled and sealed to drywall)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
	5.5 Whole-house Fan (insulated cover gasketed to the opening)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
6. Common Walls Between Dwelling Units	Requirements: Gap between drywall shaft wall (i.e., common wall) and the structural framing between units is fully sealed at all exterior boundary conditions				
	6.1 Common Wall Between Dwelling Units	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Home Energy Rating Provider: _____		Rater Inspection Date: _____		Builder Inspection Date: _____	
Home Energy Rater Company Name: _____		Builder Company Name: _____			
Home Energy Rater Signature: _____		Builder Employee Signature: _____			

Posted 09/02/09

CHAPTER 187
FORMERLY
SENATE BILL NO. 59
AS AMENDED BY

SENATE AMENDMENT NO. 3

AN ACT TO AMEND TITLE 16 OF THE DELAWARE CODE RELATING
TO ENERGY CONSERVATION.

BE IT ENACTED BY THE GENERAL ASSEMBLY OF THE STATE OF
DELAWARE:

Section 1. Amend Chapter 76, Title 16 of the Delaware Code, by striking § 7602 thereof in its entirety and by substituting in lieu thereof the following:

“§ 7602. Code for Energy Conservation.

- (a) Except as herein noted, no county or municipal building or plumbing code shall contain any provision which shall be materially at variance with most recent version of the International Code Council (ICC), International Energy Conservation Code (IECC). In effect, the highest available energy conservation code of the ICC/IECC as determined by the Delaware Energy Office shall be the referenced energy code for all new detached 1 and 2 story family dwellings and all other new residential buildings 3 stories or less in height. Energy standards for all other new buildings, to include high-rise residential, shall be established to meet the latest available standard of the American Society of Heating, Refrigerating and Air Conditioning Engineers/ Illuminating Engineering Society of North America (ASHRAE/IESNA) as determined by the Delaware Energy Office; provided, however, the respective county or municipal governments may exclude agricultural structures from these provisions. The Delaware Energy Office shall adopt these updates pursuant to 29 Del. C. Chapter 101.
- (b) The Delaware Energy Office, or its successor, shall promulgate procedures for certification of compliance with these codes and standards; to be utilized by respective local governments, provided, however, with respect to compliance with these codes and standards; for a commercial building of less than 5,000 square feet in size, the respective local government, rather than requiring that such compliance be certified by licensed engineers or architects, as is required with commercial buildings of 5,000 square feet or more, may elect to utilize a commercial buildings ASHRAE/IESNA Compliance Guide, to include computerized software compliance packages such as the Department of Energy developed COMcheck compliance software for insuring commercial energy code compliance and the Department of Energy developed REScheck compliance software for residential energy code compliance. An alternate compliance method for residential code compliance using ENERGY STAR documentation software may be used in lieu of the REScheck software. Code officials shall allow submission of documents that demonstrate energy efficiency that exceeds the requirements of the code when these State, local or national programs have been demonstrated to exceed the requirements of the code.
- (c) The Delaware Energy Office, or its successor, in consultation with the Green Building Council of the Home Builders Association of Delaware, shall establish programs to promote the construction of zero net energy homes. A zero net energy home or building is defined as a residence or commercial building that, through the use of energy efficient construction, lighting, appliances and on-site renewable energy generation, results in zero

net energy consumption from the utility provider. Therefore, a net zero energy capable home must be energy efficient enough that if the home or building owner chooses to add on-site generation, net zero energy consumption could be achieved. As of December 31, 2025 all new residential building construction in the State of Delaware shall be zero net energy capable. As of December 31, 2030 all new commercial building construction must also be zero net energy capable.

- (d) The Delaware Energy Office shall review the State Energy Code triennially for potential updates to the IECC energy code and ASHRAE energy code standard.
- (e) This Act shall become effective on July 1, 2010.
- (f) From January 1, 2010 to June 30, 2010 sellers of new construction shall notify buyers of an option to purchase the construction built to the ICC/IECC 2009 code standard.
- (g) The Delaware Energy Office will conduct energy code training work shops for code officials, builders, architects, and engineers prior to the effective date.”

Section 2. If any provision of this Act or the application thereof to any person or circumstance is held invalid, the invalidity shall not affect other provisions or applications of the Act which can be given effect without the individual provision or application; and, to that end, the provisions of this Act are declared to be severable.

Approved July 29, 2009